AMENDMENTS TO THE SPECIFICATION:

Paragraph numbers herein correspond to those appearing in the application as published by the USPTO: US 2005/0046370.

Please replace paragraph [0022] of the specification with the following amended paragraph:

[0022] Figure 1 shows a block diagram of an exemplary system 10 according to the invention. System 10 includes a device for regulating current in a PM machine 12 and includes a processing and drive circuit 11, a ~~first~~ transform circuit 24 and a current regulator 30. The device is adapted for controlling a permanent magnet (PM) machine 12, *e.g.*, a motor/generator, having a stator S and a rotor R for driving a shaft.

Please replace paragraph [0023] of the specification with the following amended paragraph:

[0023] Processing and drive circuit 11 includes a ~~second~~ transform circuit 22, a space vector modulation block 26, a pulse-width modulation (PWM) modulator 18, and an inverter 14. The machine 12 is driven by a three phrase inverter 14 coupled to a DC-link voltage source 16 (Vdc). Vdc is sometimes hereinafter referred to as the link voltage. A pulse width modulator (PWM) 18 drives the inverter 14 in a known way.

Please replace paragraph [0024] of the specification with the following amended paragraph:

[0024] Control of the PM machine 12 may be implemented by a digital signal processor (DSP) or the like. Such DSPs are known and are arranged to be responsive to various inputs for producing control outputs, for driving the machine 12 according to the invention. That is, DSPs may be used

for implementing one or more of the blocks described herein, in accordance with its respective, described functional requirements. A sensor $S\theta$ is coupled to machine 12 to produce a sensor rotor position (mechanical rotor position) signal θ_r. The sensed rotor position signal θ_r is coupled to a conversion ~~conversation~~ block 13 designated "P/2" configured to convert mechanical rotor position into an electrical rotor position θ_e. "P" is the number of machine poles. The electrical rotor position θ_e is coupled to a pair of coordinate transform circuits 22 and 24, as shown. The coordinate transform 22 transforms D-axis and Q-axis modulation index signals (V_{ds} and V_{qs}, sometimes referred to as direct and quadrature voltage command signals) to produce modulation index signals in stationary coordinates α and β. The modulation index signals in the stationary coordinate frame are coupled to and modulated by a space vector modulator 26 in a known manner to produce outputs (designated DUTY a, DUTY b and DUTY c) that drive the voltage PWM modulator 18. These outputs provide the duty cycle information to PWM modulator 18. PWM modulator block 18 generates the gate drive signals for inverter 14 for each of the three phases a, b and c, which provides voltage to machine 12.

Please replace paragraph [0026] of the specification with the following amended paragraph:

[0026] Clamp current regulator 30 is responsive to the direct and quadrature synchronous feedback axis signals Idsf and Iqsf and is configured to produce the direct and quadrature voltage command signals Vds and Vqs. Regulator 30 includes a direct-axis current command block 32, a quadrature-axis current command block 33, ~~first and second~~ summers 34 and 36, and ~~first and second~~ control circuits 38 and 40.

Please replace paragraph [0032] of the specification with the following amended paragraph:

[0032] Turning now to the circuit 38 in Figure 2, the Ids* signal and Idsf feedback signal are summed at the non-inverting (+) and inverting (-) inputs of node 34, respectively, to produce an error signal designated Id error, which is coupled to parallel connected proportional gain circuit 56 and an integrating function circuit 58. Proportional circuit 56 produces an output that is coupled to the non-inverting input (+) of summing node 60. The integrating circuit 58 includes an input coupled to node 34. Circuit 58 <u>also</u> includes <u>an</u> ~~a second~~ input configured to receive a feedback signal from a clamp or limiting circuit 62 having a feedback loop 64 as shown. The output of circuit 58 is provided to clamp or limiter 62.

Please replace paragraph [0033] of the specification with the following amended paragraph:

[0033] The proportional gain circuit 56 controls, among other things, the transient components of the Id error signal, and the integrating circuit 58 controls, among other things, steady state components of the Id error signal. The clamp 62, when implemented, is used to limit the steady state value within an allowable range (*e.g.,* -Vmag* $\leq$ Vds $\leq$ Vmag*). The output of the clamp 62 is coupled to another non-inverting input (+) of summing node 60. The output of node 60 is the unclamped D-axis modulation index signal Vds. This signal is coupled to clamp or limiting circuit 66, and when engaged, the output of the clamp 66 is the clamped D-axis modulation index signal Vds. This may correspond as well to the range: -Vmag* $\leq$ Vds $\leq$ Vmag*. As shown in Figure 1, the Vds signal is coupled to the transform circuit 22 and is fed back to the current command circuit 32. The ~~second~~ clamp 66 limits the overall output Vds.

Please replace paragraph [0036] of the specification with the following amended paragraph:

[0036] The output of the clamp 76 is coupled to another non-inverting input (+) of summing node 74 and is fed back over feedback loop 78 to integrator 72, as shown. The signals are summed at node 74, and the output of the node 74 is the unclamped Vqs. This signal is coupled to a clamp or limiting circuit 80, and when engaged, the output of the clamp is a clamped Q-axis modulation index signal Vqs. This, in turn, is coupled to the transform circuit 22 and is fed back to the current command circuit 32 as shown in Figure 1. The ~~second~~ clamp 80 limits the overall output Vqs in accordance with the following equations:

$$\text{MOTORING MODE: } MIN \leq Vqs \leq \left\lfloor \sqrt{Vmag^{*2} - Vds^{2}} \right\rfloor * K$$

$$\text{GENERATING MODE: } \underline{MIN \leq Vqs \leq (Vmag\ *) * K}$$

$$\cancel{MIN \leq Vqs \leq Vmag * K}$$

<u>These equations limit Vqs in the motoring mode to a quadrature voltage command signal limit value derived in the motoring mode from the square root of the quantity $((Vmag^*)^2 - (Vds)^2)$ and derived in the generating mode from the voltage magnitude command signal Vmag*.</u>